UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,570	06/27/2005	Simon Charles Page	42981.00009	1806

32294 7590 04/29/2008

SQUIRE, SANDERS & DEMPSEY L.L.P.
8000 TOWERS CRESCENT DRIVE
14TH FLOOR
VIENNA, VA 22182-2700

EXAMINER	
SOUW, BERNARD E	

ART UNIT	PAPER NUMBER
2881	

MAIL DATE	DELIVERY MODE
04/29/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,570	PAGE ET AL.	
	Examiner	Art Unit	
	BERNARD E. SOUW	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/8/2008 (Amdt)*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27* is/are allowed.

6)☒ Claim(s) *1-13 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/8/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. Receipt is acknowledged of information disclosure statement (IDS) submitted on 01/08/2008. The submission is in compliance with the provisions of 37 CFR 1.97.

A signed copy of the information disclosure statement is here enclosed.

Amendment

2. The Amendment filed on 01/08/2008 has been entered. The present Office Action is made with all the suggested amendments being fully considered.

Claim 1 has been amended.

Claims 14-25 have been canceled.

New claim 27 has been added.

Claims 1-13, 26 and 27 are pending in this Office Action.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coxon et al. (USPAT 6,104,029), hereinafter Coxon'029.

Coxon'029 discloses in Fig.1 a charged particle spectrometer, as recited in Col.6/ll.56-67 & Col.7/ll.1-53, the spectrometer being operable in a first mode using a hemispherical photoelectron energy analyzer 5 to produce an *energy spectrum* relating to the composition of a sample being analyzed (i.e., in the energy-dispersive *radial direction* of slit 61 on the *image plane 79* at the detector shown in Fig.1), as recited in Col.9/ll.18-23, the hemispherical aspect being self-obvious in Fig.1.

Although Coxon'029 does not expressly recite by word a *second mode* to produce a charged particle *image* of the surface being analyzed on the same detector which is used to detect charged particles produced in both modes of operation, such a detection mode is already inherent to Coxon's spectrometer, which simultaneously (in the angular direction) produces a charged particle *image* of the surface being analyzed projected onto the *image plane 79* at the detector shown in Fig.1, as recited in the Abstract/ll.6-8, col.5/ll.1-5, col.10/ll.41-44, most expressly in Col.9/ll.37-44 (emphasis added):

> *Thus, a two-dimensional electron image 79 is projected onto the image plane of the analyser having the general form of an annulus segment with electrons being separated according to their energy in the **radial** direction and according to their emission **angle circumferentially**. The electron image is detected by a two-dimensional position detector 65 which enables energy spectra over a range of emission angles to be measured simultaneously.*

It would have been obvious to one of ordinary skill in the art at the time the invention was made to refer the particular part of Coxon's spectrometer to a *second mode*, which produces a charged particle *image* of the surface (*according to the emission angle circumferentially*, i.e., in the angular direction) on the *image plane* at the *same* detector, in order make distinction from the first mode which detects the energy spectrum in the radial direction.

One of ordinary skill in the art would have been motivated to clearly distinguish between Coxon's two different detection modes, in order to avoid confusing one with the other, as both modes are simultaneously performed by the same detector.

Note: Applicant's disclosure, including the claims, as amended, fails to define "*hemispherical analyser*" and "*spherical mirror analyser*" beyond mere recitation of the terms (figure drawings are valid only as embodiment). While Coxon'029's numeral 5 is clearly a hemispherical photoelectron energy analyser, Applicant's disclosure, including the claims, does not provide any justification for the wording "*spherical mirror*". Therefore, Applicant's disclosure, including the claims, does not exclude Coxon'029's numeral 5 from being called a spherical mirror analyser that produces a charged particle image on the plane 79 of the detector.

[The diffraction image recited in Col.7/ll.2-3 is irrelevant for the rejection. Therefore, this diffraction image is simply discarded/omitted.]

► Specifically regarding claim 26, a selection between a real image of the sample surface 17 (or 15) and a photoelectron energy spectrum revealing the identity of the chemical elements at a particular point on the sample surface is recited in Col.9/ll.18-47 and Col.10/ll.37-54, especially lines 45-51.

5. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coxon'029 in view of Faris et al. (USPAT 5,265,327).

Coxon'029's detector 65 shown in Fig.1 is a two-dimensional position detector 65, as recited in Col.7/ll.48-53. Such a two-dimensional position detector is known in the art as to also include microchannel plates (MCP). As known in the art, a microchannel plate is a plate (means), which emits a plurality of secondary electrons for each primary electron received, thus covering the limitation of claims 3 and 16.

Such knowledge in the art is disclosed by Faris et al., as recited in Col.1/ll.10-58. As is obvious in Figs.3, 4, 6 10 and 12, the MCP has the form of a plate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Faris's MCP as Coxon'029's two-dimensional position detector photoelectron detector capable of recording both the photoelectron energy spectrum and the photoelectron image of the sample surface, since a spatial resolution is needed for both functions.

One of ordinary skill in the art would have been motivated to use a detector having two-dimensional position or spatial resolution, since in both functions the photoelectrons are emitted in an extended spatial extent, i.e., a dispersion according to electron energies and a spatial distribution according to sample surface.

6. Claims 5-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coxon'029 in view of Faris et al., and further in view of Wollnik et al. (USPAT 5,644,128).

Coxon'029 as modified by Faris et al. disclose all the limitations of claims 5-7, as previously applied to the parent claim 3, except the additional limitation that the two-dimensional position-sensitive detector also includes a first delay line means for using the plurality of secondary electrons to produce a pair of electrical pulses in a first delay line from which a signal processing means can calculate the location of the primary electron on the plate means in a first direction (claim 5); a second delay line means for using the plurality of secondary electrons to produce a pair of electrical pulses in a second delay line from which the signal processing means can calculate the location of the primary electron on the plate means in a second direction (claim 6); wherein the first and second directions are orthogonal (claim 7).

Using delay lines to read out MCP signal is conventional in the art. Wollnik et al. disclose a two-dimensional position-sensitive detector in the form of channel plate(s) (11a,b shown in Fig.1) that amplifies the detected particles into an electron cloud upon impact with the channel plates, which exactly match the description and function of an

MCP as used in parent claim 5, including the recitation that the rear surface of the channel plates may comprise a plane at fixed or ground potential, all recited by Wollnik et al. in Col.1/ll.56-64 and Col.5/ll.15-21.

Wollnik's two-dimensional position-sensitive detector 11a,b also includes a first delay line 13 (shown in Fig.3A,B and Fig.4B) for using the plurality of secondary electrons to produce a pair of electrical pulses in a first delay line (between 13a and 13b) from which a signal processing means can calculate the location of the primary electron on the plate 11a,b in a first direction, as recited in Col.5/ll.22-36; and a second delay line 39 (shown in Fig.4A) for using the plurality of secondary electrons to produce a pair of electrical pulses in a second delay line (between 39a and 39b) from which the signal processing means can calculate the location of the primary electron on the plate 11a,b in a second direction, as recited in Col.6/ll.8-15; wherein the first and second directions are orthogonal (addressed a x-meander and y-meander), as expressly recited in Col.6/ll.16-19 and claimed in Col.8/ll.60-62.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to equip Coxon'029/Faris's two-dimensional multichannel detector with Wollnik's readout technique based on delay lines, in order to enhance the dynamic range and increase the timing accuracy, as taught by Wollnik et al. in Col.1/ll.25-27.

One of ordinary skill in the art would have been motivated to enhance the dynamic range and increase the timing accuracy, in order to be able to record the highest count rates and thus maximize the detector capability.

7. Regarding claim 8, a second signal processing means does not need special design or device feature, as is obvious from the disclosure pg.6/ll.5-12, or PGPub 2006/0060770, sect.[0015]. Therefore, the limitation of claim 8 is equivalent to duplication of parts and/or repeat of process step to enhance measurement accuracy without producing any unexpected result.

8. Claim 9 recites the same limitation as claim 26, which has been previously rejected over Coxon'029. Therefore, claim 9 is also rejected over the same prior art (Coxon'029), but now with Faris et al., and Wollnik et al. as additional prior art due to its dependency on claim 5.

9. Regarding claim 10, Applicant's first mode is the same as Coxon'029's second mode, i.e., photoelectron energy analysis. In this mode the detected signal distribution is one-dimensional (i.e., in the energy-dispersive radial direction of slit 61), as recited in Col.9/ll.18-23.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to process such a one-dimensional signal distribution by utilizing only one of Wollnik's 2-dimensional delay line means, since the other delay line means is not needed.

One of ordinary skill in the art would have been motivated to utilize only one of Wollnik's 2-dimensional delay line means, in order to save effort, time and energy.

10. Regarding claim 11, Applicant's second mode is the same as Coxon'029's first mode, i.e., photoelectron image. In this mode the detected signal distribution is two-dimensional (i.e., image of the surface 15 of the sample 17, as recited in Col.9/ll.27-47, especially in Col.9/ll.37-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to process such a two-dimensional signal distribution by utilizing both of Wollnik's 2-dimensional delay line means, since both delay line means are now needed.

One of ordinary skill in the art would have been motivated to utilize both of Wollnik's 2-dimensional delay line means, in order to process a two-dimensional image.

11. Regarding claim 12, increasing the accuracy of time measurements of the electrical pulses is taught by Wollnik et al. in Col.1/ll.25-32.

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coxon'029 in view of Faris et al., and Wollnik et al., and further in view of Abshire (USPAT 5,566,139).

Coxon'029 as modified by Faris et al. and Wollnik et al. disclose all the limitations of claim 13, as previously applied to their respective parent claim 12, except the recitation of increasing the accuracy by stretching the time between each one of a pair of pulses so that the time difference may be more accurately measured.

Increasing the accuracy of event or sampling time measurements by time-stretching technique is well known in the art. Abshire discloses a sampling time interval unit having picosecond accuracy using a time stretching technique, the basics of which is recited in Col.3/ll.43-67 and Col.4/ll.1-34.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a time stretching technique to improve the timing accuracy of Wollnik's pulse arrival events, in order to improve the energy resolution of the photoelectron spectrum measured as well as the spatial resolution of the sample surface image.

One of ordinary skill in the art would have been motivated to enhance the resolution in Coxon'029's measurement by improving the timing accuracy of Wollnik's pulse arrival events, since the latter is directly related to spatial and energy resolutions through the delay line technique.

Final Rejection

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP §706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then

the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Allowance

14. New claim 27 is allowed.

Reasons Allowance

15. The following is an examiner's statement of reasons for allowance:

► New claim 27 is allowed for reciting a detector that includes a first delay line for using the plurality of secondary electrons to produce a pair of electrical pulses in a first delay line from which a signal processing means can calculate the location of the primary electron arriving on the detector plate in a first direction, and a second delay line for using the plurality of secondary electrons to produce a pair of electrical pulses in a second delay line from which the signal processing means can calculate the location of the primary electron arriving on the detector plate in a second direction.

Communications

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw, Ph.D., whose telephone number is

571 272 2482. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571 272 2293. The central fax phone number for the organization where this application or proceeding is assigned is 571 273 8300 for regular communications as well as for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571 272 5993.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Bernard E Souw/
Primary Examiner, Art Unit 2881